Identification_Information:
  Citation:
    Citation_Information:
      Title: Digital Geology Layer for DGS Geologic Map No. 8 (Milford-Mispillion River Quadrangles)
      Publication_Information:
        Publisher: Delaware Geological Survey, University of Delaware
        Publication_Place: Newark, Delaware
      Originator: Delaware Geological Survey, University of Delaware
      Publication_Date: 2001
      Geospatial_Data_Presentation_Form: vector digital data
      Online_Linkage: http://www.dgs.udel.edu/data
  Point_of_Contact:
    Contact_Information:
      Contact_Organization_Primary:
        Contact_Organization: Delaware Geological Survey
        Contact_Person: Digital Data Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        City: Newark
        State_or_Province: Delaware
        Postal_Code: 19716-7501
        Country: USA
        Address: Delaware Geological Survey, University of Delaware
        Address: 257 Academy Street
      Contact_Voice_Telephone: 302-831-2833
      Contact_Position: Digital Data Coordinator
      Contact_Facsimile_Telephone: 302-831-3579
      Contact_Electronic_Mail_Address: DelGeoSurvey@udel.edu
      Hours_of_Service: Mon - Fri; 8:00am to 4:30pm EST
  Description:
    Abstract:
      The vector data set contains the rock unit polygons for the surficial geology for DGS Geologic Map No. 8 (Milford-Mispillion River Quadrangles). The original Geologic Map Description of the published map follows:

This map is the first detailed surficial geologic map in southern Kent and northern Sussex counties. Other maps covering the same or adjacent areas have focused on subsurface geology (Benson and Pickett, 1986), hydrogeology (Talley, 1982), or surficial geology on a regional scale (Jordan, 1964; Owens and Denny, 1979; Ramsey and Schenck, (1990). The purpose of this map is to show the distribution of geologic units found at or near the present land surface. These units are composed of the geologic materials that support agriculture and development, are mined for sand and gravel resources, and are the surface-to-subsurface pathway for water. Initial work in the area of Milford assigned surficial deposits to the Pleistocene (Marine and Rasmussen, 1955) without formational designation. Rasmussen et al. (1960) recognized near-surface units just south of Milford to be the Brandywine Formation, the Beaverdam Sand, and the Walston Silt. Jordan (1964, 1974), assigned these units in the map area to the Columbia Formation. Owens and Minard (1979) extended stratigraphic designations recognized in New Jersey into Delaware and mapped the area as Pensauken Formation (roughly equivalent to the Columbia of Jordan, 1964), with a fringe of deposits labeled as Spring

Lake and Van Sciver Lake beds adjacent to Delaware Bay. Owens and Denny (1979) presented a different stratigraphy in a regional map showing the Beaverdam Sand as the dominant surficial deposit with a fringe along Delaware Bay of, from west to east, the Omar Formation and the Ironside Formation. Talley (1982) considered the entire area of the Milford Quadrangle to be covered by the Columbia Formation. Ramsey and Schenck (1990) mapped the Columbia Formation as the major surficial deposit with a younger Pleistocene unit along Delaware Bay given the informal designation of Delaware Bay deposits.

The suficial units on this map were recognized on their lithologic characteristics and internal stratigraphy from examination of over 600 lithologic logs from water well and test hole borings as well as outcrop information and shallow soil auger borings. The map units were compared to previously named units to determine the stratigraphic nomenclature. The Columbia Formation is retained in the sense of Jordan (1974). Other previously used names were rejected because of lithologic characteristics different from those units found in the map area. This map includes two new lithostratigraphic units, the Lynch Heights Formation and the Scotts Corner Formation.

These units are refinements based on additional geologic information about the Delaware Bay deposits of Ramsey and Schenck (1990). Palynological data proved to be useful in support of differentiation of the two units, especially the stratigraphic distribution of Quercus (oak) species (Johan J. Groot, pers. comm.). Interpretations of climate and vegetation based on the palynology are in the adjoining table. The type section for the Scotts is designated as Lf14-p (adjoining figure). Reference sections are designated as Lf23-x, Mf25-a, and MG33-g. The type section for the Lynch Heights Formation is designated as Lf21-19 (adjoining figure). Reference sections are Le14-18, Le25-12, and boring Lf-53-a. Descriptions of reference sections are available from the Delaware Geological Survey (DGS) upon request and will be published along with other data in support of this map as part of a DGS Report of Investigations. Recognition of subsurface units (the Calvert, Choptank and St. Marys formations) is an extension of the work of Benson et al. (1985), Benson and Pickett (1986), Andres (1986), Groot et al. (1990), Benson (1990), and Ramsey and Schenck (1990). Published (Groot, 1992) and unpublished palynostratigraphic data were used as aids in recognition of these units.

Distribution of Holocene deposits of swamp, marsh, and beach were mapped on the basis of vegetation observed on aerial photographs and spot checked in the field for accuracy. Mapped areas are not to be used for wetlands designation as they represent distrib ution of lithologies deposited in environments characterized by vegetation rather than the environments themselves. Offshore distribution of bottom sediment type is based on unpublished data from the Delaware Geological Survey as well as data from Marx (1981), Maley (1981), Strom (1972), and Wethe (1984). Historical shoreline positions are based on data from aerial photographs (1954) and topographic maps (1981).

Purpose: To facilitate the GIS community of Delaware and to release the geologic map of the Milford and Mispillion River areas with all cartographic elements (including geologic symbology, text, etc.) in a form usable in a GIS, we have released this digital ESRI shapefile of DGS Geological Map 8. The update of earlier work and mapping of new units is important not only to geologists, but also to hydrologists who wish to

understand the distribution of water resources, to engineers who need bedrock information during construction of roads and buildings, to government officials and agencies who are planning for residential and commercial growth, and to citizens who are curious about the bedrock under their homes. Formal names are assigned to all rock units according to the guidelines of the 1983 North American Stratigraphic Code (NACSN, 1983).

Time_Period_of_Content:
Currentness_Reference: publication date
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2001

Status:
Maintenance_and_Update_Frequency: None planned
Progress: Complete

Keywords:
Theme:
Theme_Keyword_Thesaurus: none
Theme_Keyword: geoscientificInformation
Theme_Keyword: Delaware
Theme_Keyword: Delaware Geology
Theme_Keyword: geology
Theme_Keyword: coastal plain geology
Theme_Keyword: environment

Place:
Place_Keyword: Delaware
Place_Keyword: Kent County
Place_Keyword: Lynch Heights
Place_Keyword: Milford Neck Wildlife Area
Place_Keyword: Murderkill River
Place_Keyword: Church Hill
Place_Keyword: Frederica
Place_Keyword: Big Stone Beach
Place_Keyword: Houston
Place_Keyword: Sussex County
Place_Keyword: Milford
Place_Keyword: Mispillion Light
Place_Keyword: Abbotts Mill
Place_Keyword: Prime Hook National Wildlife Refuge
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Place_Keyword: Cedar Creek
Place_Keyword: Slaughter Beach
Place_Keyword: Fowler Beach
Place_Keyword: Shawnee
Place_Keyword_Thesaurus: USGS GNIS

Access_Constraints: None- Please give proper credit to the Delaware Geological Survey. Please reference as follows: Ramsey, K. W., 1993, Geologic Map of the Milford and Mispillion River Quadrangles: Delaware Geological Survey Geologic Map Series No. 8.

Use_Constraints: The Delaware Geological Survey (DGS) is constantly gathering data from multiple sources, interpreting the data, and reflecting its interpretations on maps. DGS's interpretations of multiple data sources are reflected in this map available for download. Reasonable efforts have been made by DGS to verify that this digital shapefile

accurately interprets the source data used in its preparation; however, this map may contain omissions and errors in scale, resolution, rectification, positional accuracy, development methodology, interpretations of source data, and other circumstances. This map is also date specific and as additional data becomes available and as verification of source data continues, this map may be reinterpreted and updated by DGS without notification. The DGS maintains a digital geologic polygon layer on which these changes may be reflected. Please check the metadata for these layers to verify any updates. This map was prepared for a scale of 1:24,000 and should not be used at larger scales for denotation of rock unit boundaries. Nothing contained herein shall be deemed an expressed or implied waiver of the sovereign immunity of the State of Delaware or its duly authorized representatives, agents, or employees.
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  Distributor:
    Contact_Information:
      Contact_Organization_Primary:
        Contact_Organization: Delaware Geological Survey, University of Delaware
        Contact_Person: Digital Data Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        City: Newark
        State_or_Province: Delaware
        Postal_Code: 19716-7501
        Country: USA
        Address: Delaware Geological Survey, University of Delaware
        Address: University of Delaware
      Contact_Voice_Telephone: 302-831-2833
      Contact_Position: Digital Data Coordinator
      Contact_Facsimile_Telephone: 302-831-3579
      Contact_Electronic_Mail_Address: DelGeoSurvey@udel.edu
      Hours_of_Service: Mon - Fri; 8:00am to 4:30pm EST
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  Standard_Order_Process:
    Digital_Form:
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    Contact_Information:
      Contact_Address:
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        State_or_Province: Delaware
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        Address_Type: mailing and physical address
        Country: USA
        Address: Delaware Geological Survey, University of Delaware
        Address: University of Delaware
      Contact_Organization_Primary:
        Contact_Person: Digital Data Coordinator
        Contact_Organization: Delaware Geological Survey, University of
Delaware
      Contact_Voice_Telephone: 302-831-2833
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      Contact_Facsimile_Telephone: 302-831-3579
      Contact_Electronic_Mail_Address: DelGeoSurvey@udel.edu
      Hours_of_Service: Mon - Fri; 8:00am to 4:30pm EST
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  Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial
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    Vertical_Positional_Accuracy:
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contour interval. The contour interval of the maps used in this
construction was 5 feet in the Delaware Coastal Plain area and 10 feet in
the Delaware Piedmont area which gives a plus or minus 5 foot and 10 foot
vertical accuracy, respectively, according to National Map Accuracy
Standards.
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of those maps is plus or minus 40 feet according to National Map Accuracy
Standards.
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  Direct_Spatial_Reference_Method: Vector
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      SDTS_Point_and_Vector_Object_Type: G-polygon
      Point_and_Vector_Object_Count: 499
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automatically generated.
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Stratigraphy web page.
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for Delaware geologic units. Geologic Unit Names are documented in DGS
Stratigraphic web page.
    Attribute:
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assigned to each geologic unit based on a variety of geologic
interpretations including: stratigraphic position and relationship; macro
and mircofossil content, and radiogenic analyses.
Keywords:
  Place:
    Place_Keyword_Thesaurus: USGS GNIS
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